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Metallized Polypropylene DC-Link Film Capacitor Industrial Grade



FEATURES

- High density DC-link capacitor (more C per volume)
- Very long useful life time: up to 100 000 h at U_{NDC} and 70 °C
- High ripple current capability, low ESR, low ESL
- Temperature range: 105 °C
- Mounting: radial
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE

APPLICATIONS

- Renewable energies inverters
- UPS
- Battery chargers
- Motor drives

QUICK REFERENCE DATA	
Rated capacitance range	1 µF to 500 µF
Capacitance tolerance	± 5 %
Climatic testing class	55/105/56
Rated temperature	85 °C
Maximum permissible case temperature	105 °C, observing voltage derating
Maximum applicable peak to peak ripple voltage	0.2 x U_{NDC}
Reference standards	IEC 61071, IEC 60068
Dielectric	Polypropylene film
Electrodes	Metallized dielectric capacitor
Construction	Mono construction
Encapsulation	Plastic case sealed with resin; flame retardant
Terminals	Tinned wire
Self inductance (L_S)	< 1 nH per mm of lead spacing
Withstanding DC voltage between terminals (1)	1.5 U_{NDC} for 10 s, cut off current 10 mA, rise time ≤ 1000 V/s
Insulation resistance	RC between leads, after 1 min > 10 000 s For U_{NDC} ≤ 500 V measuring voltage 100 V For U_{NDC} > 500 V measuring voltage 500 V
Life time expectancy (2)	Useful life time: > 100 000 h at U_{NDC} and 70 °C FIT: < 10 x 10^{-9}/h (10 per 10^9 component h) at 0.5 x U_{NDC}, 40 °C
Marking	C-value; tolerance; rated voltage; code for dielectric material; code for manufacturing origin; manufacturer's type designation; manufacturer's logo; year and week of manufacture

Notes

- For more detailed data and test requirements, contact dc-film@vishay.com
- For general information like characteristics and definitions used for film capacitors follow the link: www.vishay.com/doc?28147

(1) See document "Voltage Proof Test for Metalized Capacitors" (www.vishay.com/doc?28169)

(2) Statements about life time are based on calculations which are based on internal tests again. They have to be understood exclusively as estimations. Also due to external factors, the life time in the field application may deviate from the calculated life time

DC VOLTAGE RATINGS						
U_{NDC} at 85 °C	500 V	600 V	800 V	900 V	1000 V	1200 V
U_{OPDC} at 70 °C	600 V	720 V	960 V	1100 V	1200 V	1440 V
U_{OPDC} at 105 °C	350 V	420 V	560 V	650 V	700 V	850 V

For technical questions, contact: dc-film@vishay.com

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COMPOSITION OF CATALOG NUMBER

MULTIPLIER (nF)	
10	4
100	5
1000	6
10 000	7

CAPACITANCE (numerically)

Example		
510	1000 nF	1 µF
610	10 000 nF	10 µF
710	100 000 nF	100 µF

P1 (mm)	PITCH CODE
27.5	K
37.5	P
52.5	Y

MKP	1848 C	6	12	90	J	P	4

TYPE CONSTRUCTION

METALLIZED POLYPROPYLENE

VOLTAGE
U_N = 50 = 500 V_{DC}
U_N = 60 = 600 V_{DC}
U_N = 80 = 800 V_{DC}
U_N = 90 = 900 V_{DC}
U_N = 10 = 1000 V_{DC}
U_N = 12 = 1200 V_{DC}

TOLERANCE	
J	± 5 %
K	± 10 %

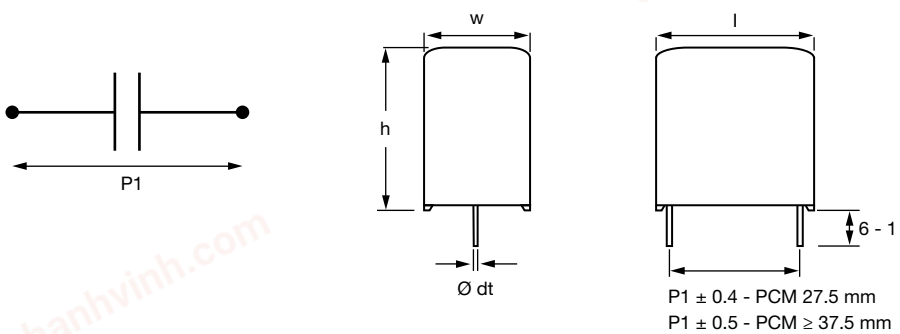
SPECIAL CODE FOR TERMINAL	
2	2 pins
4	4 pins P2 = 10.2 mm
5	4 pins P2 = 20.3 mm
(1)	Customized

Note

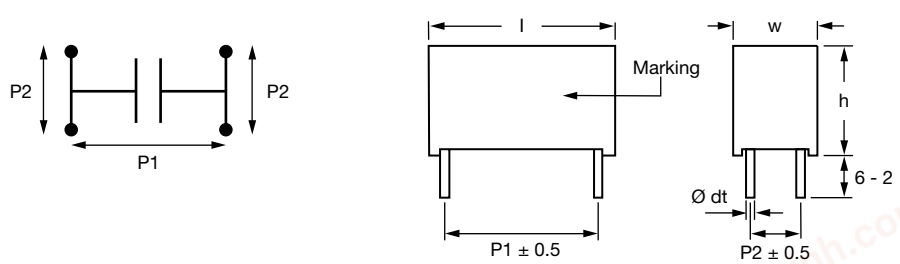
(1) Tabs terminals or customized terminals are available on request

DIMENSIONS in millimeters

2 PINS



4 PINS



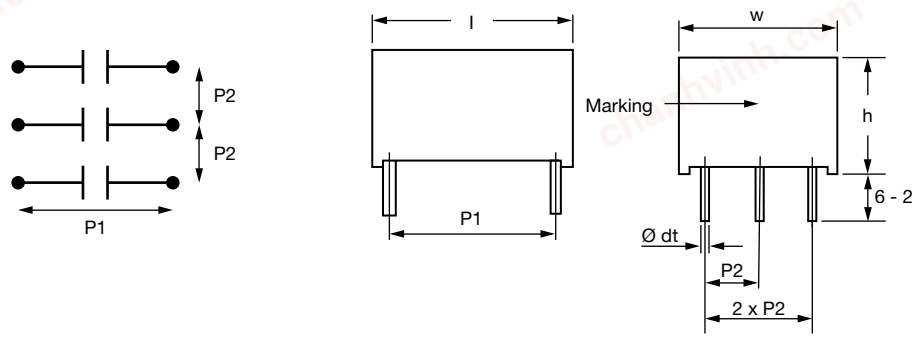
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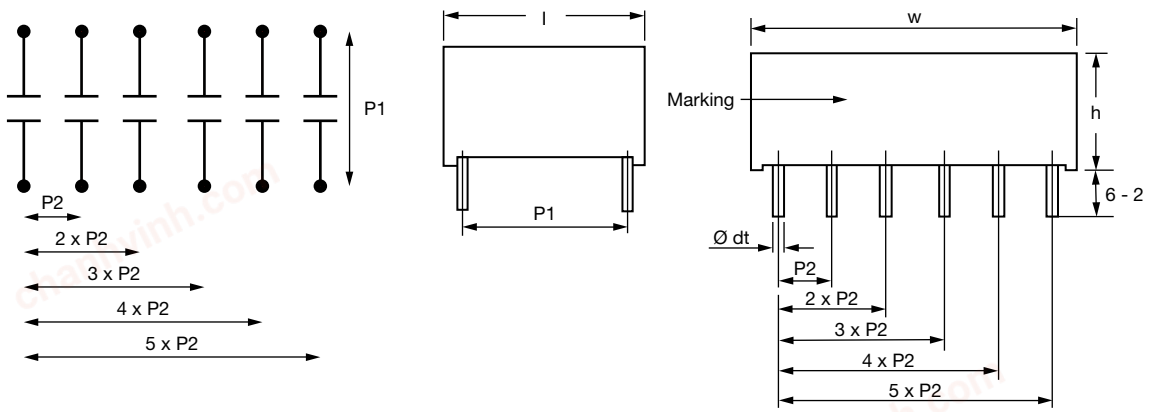
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DIMENSIONS in millimeters

6 PINS (1)



12 PINS (1)



Notes

- Ø dt ± 10 % of standard diameter specified
- For pitch 27.5 mm marking will be either on top or front side.
  For pitch ≥ 37.5 mm marking will be on front side only / 6 pins and 12 pins lateral side

(1) 6 pins and 12 pins capacitors nominal capacitance is achieved by connecting the represented individual cells in parallel

ELECTRICAL DATA AND ORDERING CODE

U_{NDC} AT 85 °C (V)	CAP. (8) (µF)	DIMENSION (5) (mm)			P1 (mm)	P2 (mm)	dV/dt (V/µs)	I_{PEAK} (A)	I_{RMS} (2) (A)		ESR (3) (mΩ)		tan δ 10 kHz (< 10^{-4}) (4)		ORDERING CODE (1)
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
500	U_{OPDC} AT 70 °C = 600 V, U_{OPDC} AT 105 °C = 350 V														
	1	9.0	19.0	32.0	27.5	-	40	40	1.5	-	90	-	110	-	MKP1848C51050JK2
	2	9.0	19.0	32.0	27.5	-	40	80	2	-	45	-	110	-	MKP1848C52050JK2
	3	9.0	19.0	32.0	27.5	-	40	120	2.5	-	30	-	110	-	MKP1848C53050JK2
	4	11.0	21.0	32.0	27.5	-	40	160	3.5	-	23	-	110	-	MKP1848C54050JK2
	5	11.0	21.0	32.0	27.5	-	40	200	3.5	-	18	-	110	-	MKP1848C55050JK2
	6	15.0	25.0	32.0	27.5	-	40	240	4.5	-	15	-	110	-	MKP1848C56050JK2
	7	15.0	25.0	32.0	27.5	-	40	280	5	-	13	-	110	-	MKP1848C57050JK2
	8	15.0	25.0	32.0	27.5	-	40	320	6	-	12	-	110	-	MKP1848C58050JK2
	9	18.0	28.0	32.0	27.5	-	40	360	7	-	11	-	110	-	MKP1848C59050JK2
	10	18.0	28.0	32.0	27.5	-	40	400	7	-	10	-	110	-	MKP1848C61050JK2
	12	18.0	28.0	32.0	27.5	-	40	480	8	-	8	-	110	-	MKP1848C61250JK2
	15	21.0	31.0	32.0	27.5	-	40	600	9	-	7	-	110	-	MKP1848C61550JK2
	18	20.0	35.0	32.0	27.5	-	40	720	9	-	6	-	110	-	MKP1848C61850JK2
	20	18.5	35.5	43.0	37.5	10.2	20	400	8	9	9	8	210	200	MKP1848C62050JP*

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ELECTRICAL DATA AND ORDERING CODE

U_{NDC} AT 85 °C (V)	CAP. [8] (µF)	DIMENSION [5] (mm)			P1 (mm)	P2 (mm)	dV/dt (V/µs)	I_{PEAK} (A)	I_{RMS} [2] (A)		ESR [3] (mΩ)		tan δ 10 kHz (< 10^{-4}) [4]		ORDERING CODE [1]
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
	U_{OPDC} AT 70 °C = 600 V, U_{OPDC} AT 105 °C = 350 V														
500	22	21.5	38.5	42.0	37.5	10.2	20	440	9	10	9	7	210	200	MKP1848C62250JP*
	25	21.5	38.5	42.0	37.5	10.2	20	500	9	10	8	6	210	200	MKP1848C62550JP*
	30	24.0	44.0	42.0	37.5	10.2	20	600	11	13	7	5	210	200	MKP1848C63050JP*
	35	24.0	44.0	42.0	37.5	10.2	20	700	12	14	6	4.5	210	200	MKP1848C63550JP*
	40	30.0	45.0	42.0	37.5	10.2 / 20.3	20	800	13	15	5	4	210	200	MKP1848C64050JP*
	45	30.0	45.0	42.0	37.5	10.2 / 20.3	20	900	14	16	4.5	3.5	210	200	MKP1848C64550JP*
	50	30.0	45.0	42.0	37.5	10.2 / 20.3	20	1000	15	17	4	3	210	200	MKP1848C65050JP*
	55	30.0	57.0	42.0	37.5	20.3	20	1100	16	18	3.5	3	210	200	MKP1848C65550JP*
	60	30.0	57.0	42.0	37.5	20.3	20	1200	16	18	3.5	3	210	200	MKP1848C66050JP*
	65	30.0	57.0	42.0	37.5	20.3	20	1300	18	19	2.5	2	210	200	MKP1848C66550JP*
	50	25.0	45.0	57.5	52.5	10.2	10	500	10	11	7	6	450	400	MKP1848C65050JY*
	55	25.0	45.0	57.5	52.5	10.2	10	550	11	13	7	6	450	400	MKP1848C65550JY*
	60	30.0	45.0	57.5	52.5	20.3	10	600	12	14	6	5	450	400	MKP1848C66050JY*
	65	30.0	45.0	57.5	52.5	20.3	10	650	12	14	6	5	450	400	MKP1848C66550JY*
	70	30.0	45.0	57.5	52.5	20.3	10	700	13	15	6	5	450	400	MKP1848C67050JY*
	75	35.0	50.0	57.5	52.5	20.3	10	750	14	16	5	4	450	400	MKP1848C67550JY*
	80	35.0	50.0	57.5	52.5	20.3	10	800	15	17	4.5	3	450	400	MKP1848C68050JY*
	90	35.0	50.0	57.5	52.5	20.3	10	900	16	18	4	3	450	400	MKP1848C69050JY*
	100	35.0	50.0	57.5	52.5	20.3	10	1000	17	19	4	3	450	400	MKP1848C71050JY*
	110	45.0	45.0	57.5	52.5	20.3	10	1100	-	19	-	2.5	-	450	MKP1848C71150JY5
	120	45.0	45.0	57.5	52.5	20.3	10	1200	-	19	-	2.5	-	450	MKP1848C71250JY5
	250 [6]	65.5	65.0	57.5	52.5	20.3	10	833	-	25	-	2	-	450	MKP1848C72550JY5
	500 [7]	130.0	65.0	57.5	52.5	20.3	10	833	-	45	-	1.5	-	500	MKP1848C75050JY5
600	U_{OPDC} AT 70 °C = 720 V, U_{OPDC} AT 105 °C = 420 V														
	1	9.0	19.0	32.0	27.5	-	50	50	2.5	-	55	-	85	-	MKP1848C51060JK2
	2	9.0	19.0	32.0	27.5	-	50	100	3	-	35	-	85	-	MKP1848C52060JK2
	3	11.0	21.0	32.0	27.5	-	50	150	4	-	23	-	85	-	MKP1848C53060JK2
	4	11.0	21.0	32.0	27.5	-	50	200	4	-	21	-	85	-	MKP1848C54060JK2
	5	13.0	23.0	32.0	27.5	-	50	250	5	-	17	-	85	-	MKP1848C55060JK2
	6	15.0	25.0	32.0	27.5	-	50	300	6	-	14	-	85	-	MKP1848C56060JK2
	7	15.0	25.0	32.0	27.5	-	50	350	6	-	12	-	85	-	MKP1848C57060JK2
	8	18.0	28.0	32.0	27.5	-	50	400	8	-	9	-	85	-	MKP1848C58060JK2
	9	18.0	28.0	32.0	27.5	-	50	450	8	-	9	-	85	-	MKP1848C59060JK2
	10	18.0	28.0	32.0	27.5	-	50	500	9	-	8	-	85	-	MKP1848C61060JK2
	12	21.0	31.0	32.0	27.5	-	50	600	10	-	7	-	85	-	MKP1848C61260JK2
	15	20.0	35.0	32.0	27.5	-	50	750	10	-	6	-	85	-	MKP1848C61560JK2
	10	18.5	35.5	43.0	37.5	10.2	25	250	7	8	14	12	160	140	MKP1848C61060JP*
	12	18.5	35.5	43.0	37.5	10.2	25	300	8	9	12	10	160	140	MKP1848C61260JP*
	15	18.5	35.5	43.0	37.5	10.2	25	375	9	10	9	8	160	140	MKP1848C61560JP*
	20	21.5	38.5	42.0	37.5	10.2	25	500	11	12	7	6	160	140	MKP1848C62060JP*
	22	21.5	38.5	42.0	37.5	10.2	25	550	11	12	8	7	160	140	MKP1848C62260JP*
	25	21.5	38.5	42.0	37.5	10.2	25	625	11	13	7	6	160	140	MKP1848C62560JP*
	30	24.0	44.0	42.0	37.5	10.2	25	750	13	15	6	5	160	140	MKP1848C63060JP*
	35	30.0	45.0	42.0	37.5	10.2 / 20.3	25	875	17	18	4	3.5	160	140	MKP1848C63560JP*
	40	30.0	45.0	42.0	37.5	10.2 / 20.3	25	1000	17	18	4	3.5	160	140	MKP1848C64060JP*
	45	30.0	45.0	42.0	37.5	10.2 / 20.3	25	1125	17	18	4	3.5	160	140	MKP1848C64560JP*
	50	30.0	57.0	42.0	37.5	20.3	25	1250	18	19	3.0	2.5	160	140	MKP1848C65060JP*

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		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
	U_{OPDC} AT 70 °C = 720 V, U_{OPDC} AT 105 °C = 420 V														
600	40	25.0	45.0	57.5	52.5	10.2	14	560	13	14	7	6	350	300	MKP1848C64060JY*
	45	25.0	45.0	57.5	52.5	10.2	14	630	13	14	7	6	350	300	MKP1848C64560JY*
	50	30.0	45.0	57.5	52.5	20.3	14	700	15	16	6	5	350	300	MKP1848C65060JY*
	55	30.0	45.0	57.5	52.5	20.3	14	770	15	16	6	5	350	300	MKP1848C65560JY*
	60	30.0	45.0	57.5	52.5	20.3	14	840	15	17	5	4	350	300	MKP1848C66060JY*
	65	35.0	50.0	57.5	52.5	20.3	14	910	18	20	4	3.5	350	300	MKP1848C66560JY*
	70	35.0	50.0	57.5	52.5	20.3	14	980	18	20	4.5	4	350	300	MKP1848C67060JY*
	75	35.0	50.0	57.5	52.5	20.3	14	1050	18	21	4	3.5	350	300	MKP1848C67560JY*
	80	35.0	50.0	57.5	52.5	20.3	14	1120	18	21	4	3.5	350	300	MKP1848C68060JY*
	90	45.0	45.0	57.5	52.5	20.3	14	1260	-	22	-	3	-	300	MKP1848C69060JY5
	100	45.0	45.0	57.5	52.5	20.3	14	1400	-	23	-	2.5	-	300	MKP1848C71060JY5
	200 [6]	65.5	65.0	57.5	52.5	20.3	14	933	-	30	-	2	-	350	MKP1848C72060JY5
	400 [7]	130.0	65.0	57.5	52.5	20.3	14	933	-	50	-	1.5	-	400	MKP1848C74060JY5
800	U_{OPDC} AT 70 °C = 960 V, U_{OPDC} AT 105 °C = 560 V														
	1	9.0	19.0	32.0	27.5	-	60	60	2.5	-	55	-	70	-	MKP1848C51080JK2
	2	9.0	19.0	32.0	27.5	-	60	120	3	-	35	-	70	-	MKP1848C52080JK2
	3	11.0	21.0	32.0	27.5	-	60	180	4	-	23	-	70	-	MKP1848C53080JK2
	4	13.0	23.0	32.0	27.5	-	60	240	5	-	17	-	70	-	MKP1848C54080JK2
	5	15.0	25.0	32.0	27.5	-	60	300	6	-	14	-	70	-	MKP1848C55080JK2
	6	18.0	28.0	32.0	27.5	-	60	360	7	-	12	-	70	-	MKP1848C56080JK2
	7	18.0	28.0	32.0	27.5	-	60	420	8	-	10	-	70	-	MKP1848C57080JK2
	8	18.0	28.0	32.0	27.5	-	60	480	8	-	9	-	70	-	MKP1848C58080JK2
	9	21.0	31.0	32.0	27.5	-	60	540	10	-	7.5	-	70	-	MKP1848C59080JK2
	10	21.0	31.0	32.0	27.5	-	60	600	10	-	7	-	70	-	MKP1848C61080JK2
	12	20.0	35.0	32.0	27.5	-	60	720	11	-	6	-	70	-	MKP1848C61280JK2
	10	18.5	35.5	43.0	37.5	10.2	35	350	7	8	14	12	140	120	MKP1848C61080JP*
	12	18.5	35.5	43.0	37.5	10.2	35	420	8	9	12	10	140	120	MKP1848C61280JP*
	15	18.5	35.5	43.0	37.5	10.2	35	525	9	10	9	8	140	120	MKP1848C61580JP*
	20	21.5	38.5	42.0	37.5	10.2	35	700	11	12	7	6	140	120	MKP1848C62080JP*
	22	24.0	44.0	42.0	37.5	10.2	35	770	13	14	6	5	140	120	MKP1848C62280JP*
	25	24.0	44.0	42.0	37.5	10.2	35	875	13	14	6	5	140	120	MKP1848C62580JP*
	30	30.0	45.0	42.0	37.5	10.2 / 20.3	35	1050	16	17	5	4	140	120	MKP1848C63080JP*
	35	30.0	45.0	42.0	37.5	10.2 / 20.3	35	1225	17	18	4	3.5	140	120	MKP1848C63580JP*
	40	30.0	57.0	42.0	37.5	20.3	35	1400	18	19	3	2.5	140	120	MKP1848C64080JP*
	30	25.0	45.0	57.5	52.5	10.2	18	540	11	12	9	8	280	240	MKP1848C63080JY*
	35	25.0	45.0	57.5	52.5	10.2	18	630	12	13	8	7	280	240	MKP1848C63580JY*
	40	25.0	45.0	57.5	52.5	10.2	18	720	13	14	7	6	280	240	MKP1848C64080JY*
	45	30.0	45.0	57.5	52.5	20.3	18	810	14	15	6	5	280	240	MKP1848C64580JY*
	50	30.0	45.0	57.5	52.5	20.3	18	900	15	16	6	5	280	240	MKP1848C65080JY*
	55	35.0	50.0	57.5	52.5	20.3	18	990	17	18	5	4	280	240	MKP1848C65580JY*
	60	35.0	50.0	57.5	52.5	20.3	18	1080	18	19	5	4	280	240	MKP1848C66080JY*
	65	35.0	50.0	57.5	52.5	20.3	18	1170	19	20	4	3.5	280	240	MKP1848C66580JY*
	70	45.0	45.0	57.5	52.5	20.3	18	1260	-	20	-	3.5	-	240	MKP1848C67080JY5
	75	45.0	45.0	57.5	52.5	20.3	18	1350	-	22	-	3	-	240	MKP1848C67580JY5
	80	45.0	45.0	57.5	52.5	20.3	18	1440	-	22	-	3	-	240	MKP1848C68080JY5
	160 [6]	65.5	65.0	57.5	52.5	20.3	18	960	-	30	-	2.5	-	280	MKP1848C71680JY5
	320 [7]	130.0	65.0	57.5	52.5	20.3	18	960	-	55	-	1.5	-	280	MKP1848C73280JY5

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ELECTRICAL DATA AND ORDERING CODE

U_{NDC} AT 85 °C (V)	CAP. [8] (µF)	DIMENSION [5] (mm)			P1 (mm)	P2 (mm)	dV/dt (V/µs)	I_{PEAK} (A)	I_{RMS} [2] (A)		ESR [3] (mΩ)		tan δ 10 kHz (< 10^{-4}) [4]		ORDERING CODE [1]
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
	U_{OPDC} AT 70 °C = 1100 V, U_{OPDC} AT 105 °C = 650 V														
	1	9.0	19.0	32.0	27.5	-	65	65	2	-	65	-	60	-	MKP1848C51090JK2
	2	11.0	21.0	32.0	27.5	-	65	130	3	-	30	-	60	-	MKP1848C52090JK2
	3	13.0	23.0	32.0	27.5	-	65	195	4	-	20	-	60	-	MKP1848C53090JK2
	4	15.0	25.0	32.0	27.5	-	65	260	5	-	16	-	60	-	MKP1848C54090JK2
	5	18.0	28.0	32.0	27.5	-	65	325	7	-	13	-	60	-	MKP1848C55090JK2
	6	18.0	28.0	32.0	27.5	-	65	390	7	-	11	-	60	-	MKP1848C56090JK2
	7	21.0	31.0	32.0	27.5	-	65	455	9	-	9	-	60	-	MKP1848C57090JK2
	8	21.0	31.0	32.0	27.5	-	65	520	9	-	8	-	60	-	MKP1848C58090JK2
	9	20.0	35.0	32.0	27.5	-	65	585	9	-	7	-	60	-	MKP1848C59090JK2
	10	20.0	35.0	32.0	27.5	-	65	650	9	-	7	-	60	-	MKP1848C61090KK2
	9	18.5	35.5	43.0	37.5	10.2	35	315	8	9	14	12	120	110	MKP1848C59090JP*
	10	18.5	35.5	43.0	37.5	10.2	35	350	8	9	13	11	120	110	MKP1848C61090JP*
	12	18.5	35.5	43.0	37.5	10.2	35	420	8	9	11	9	120	110	MKP1848C61290JP*
900	15	21.5	38.5	42.0	37.5	10.2	35	525	10	11	9	8	120	110	MKP1848C61590JP*
	20	24.0	44.0	42.0	37.5	10.2	35	700	13	14	6	5	120	110	MKP1848C62090JP*
	22	30.0	45.0	42.0	37.5	10.2 / 20.3	35	770	14	15	6	5	120	110	MKP1848C62290JP*
	25	30.0	45.0	42.0	37.5	10.2 / 20.3	35	875	15	16	5	4.5	120	110	MKP1848C62590JP*
	30	30.0	57.0	42.0	37.5	20.3	35	1050	17	18	4.5	4	120	110	MKP1848C63090JP*
	35	30.0	57.0	42.0	37.5	20.3	35	1225	18	19	3.5	3	120	110	MKP1848C63590JP*
	30	25.0	45.0	57.5	52.5	10.2	18	540	12	13	8	7	240	220	MKP1848C63090JY*
	35	30.0	45.0	57.5	52.5	20.3	18	630	13	14	7	6	240	220	MKP1848C63590JY*
	40	30.0	45.0	57.5	52.5	20.3	18	720	14	15	6	5	240	220	MKP1848C64090JY*
	45	35.0	50.0	57.5	52.5	20.3	18	810	16	17	6	5	240	220	MKP1848C64590JY*
	50	35.0	50.0	57.5	52.5	20.3	18	900	17	18	5	4.5	240	220	MKP1848C65090JY*
	55	45.0	45.0	57.5	52.5	20.3	18	990	-	19	-	4	-	220	MKP1848C65590JY5
	60	45.0	45.0	57.5	52.5	20.3	18	1080	-	20	-	3.5	-	220	MKP1848C66090JY5
	120 [6]	65.5	65.0	57.5	52.5	20.3	18	720	-	25	-	3	-	240	MKP1848C71290JY5
	240 [7]	130.0	65.0	57.5	52.5	20.3	18	720	-	45	-	1.5	-	240	MKP1848C72490JY5
	U_{OPDC} AT 70 °C = 1200 V, U_{OPDC} AT 105 °C = 700 V														
	1	9.0	19.0	32.0	27.5	-	70	70	2	-	65	-	50	-	MKP1848C51010JK2
	2	13.0	23.0	32.0	27.5	-	70	140	3.5	-	30	-	50	-	MKP1848C52010JK2
	3	15.0	25.0	32.0	27.5	-	70	210	5	-	21	-	50	-	MKP1848C53010JK2
	4	18.0	28.0	32.0	27.5	-	70	280	6	-	16	-	50	-	MKP1848C54010JK2
	5	21.0	31.0	32.0	27.5	-	70	350	7	-	13	-	50	-	MKP1848C55010JK2
	6	21.0	31.0	32.0	27.5	-	70	420	8	-	10	-	50	-	MKP1848C56010JK2
	7	20.0	35.0	32.0	27.5	-	70	490	9	-	9	-	50	-	MKP1848C57010JK2
	5	18.5	35.5	43.0	37.5	10.2	35	175	6	7	21	19	100	90	MKP1848C55010JP*
1000	6	18.5	35.5	43.0	37.5	10.2	35	210	6	7	18	16	100	90	MKP1848C56010JP*
	7	18.5	35.5	43.0	37.5	10.2	35	245	6	7	18	16	100	90	MKP1848C57010JP*
	8	18.5	35.5	43.0	37.5	10.2	35	280	7	8	16	14	100	90	MKP1848C58010JP*
	9	18.5	35.5	43.0	37.5	10.2	35	315	7	8	14	12	100	90	MKP1848C59010JP*
	10	21.5	38.5	42.0	37.5	10.2	35	350	8	9	12	11	100	90	MKP1848C61010JP*
	12	21.5	38.5	42.0	37.5	10.2	35	420	9	10	10	9	100	90	MKP1848C61210JP*
	15	24.0	44.0	42.0	37.5	10.2	35	525	11	12	8	7	100	90	MKP1848C61510JP*
	20	30.0	45.0	42.0	37.5	10.2 / 20.3	35	700	14	15	6	5	100	90	MKP1848C62010JP*
	22	30.0	57.0	42.0	37.5	20.3	35	770	14	15	6	5	100	90	MKP1848C62210JP*
	25	30.0	57.0	42.0	37.5	20.3	35	875	16	17	4	3.5	100	90	MKP1848C62510JP*

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ELECTRICAL DATA AND ORDERING CODE

U_{NDC} AT 85 °C (V)	CAP. [8] (µF)	DIMENSION [5] (mm)			P1 (mm)	P2 (mm)	dV/dt (V/µs)	I_{PEAK} (A)	I_{RMS} [2] (A)		ESR [3] (mΩ)		tan δ 10 kHz (< 10^{-4}) [4]		ORDERING CODE [1]
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
	U_{OPDC} AT 70 °C = 1200 V, U_{OPDC} AT 105 °C = 700 V														
1000	15	25.0	45.0	57.5	52.5	10.2	18	270	9	10	14	12	210	190	MKP1848C61510JY*
	20	25.0	45.0	57.5	52.5	10.2	18	360	9	10	12	11	210	190	MKP1848C62010JY*
	22	25.0	45.0	57.5	52.5	10.2	18	396	10	11	11	10	210	190	MKP1848C62210JY*
	25	30.0	45.0	57.5	52.5	20.3	18	450	11	12	10	9	210	190	MKP1848C62510JY*
	30	30.0	45.0	57.5	52.5	20.3	18	540	12	13	8	7	210	190	MKP1848C63010JY*
	35	35.0	50.0	57.5	52.5	20.3	18	630	14	15	7	6	210	190	MKP1848C63510JY*
	40	35.0	50.0	57.5	52.5	20.3	18	720	15	17	6	5	210	190	MKP1848C64010JY*
	45	45.0	45.0	57.5	52.5	20.3	18	810	-	17	-	5	-	190	MKP1848C64510JY5
	50	45.0	45.0	57.5	52.5	20.3	18	900	-	18	-	4	-	190	MKP1848C65010JY5
	100 [6]	65.5	65.0	57.5	52.5	20.3	18	600	-	25	-	3.5	-	210	MKP1848C71010JY5
	200 [7]	130.0	65.0	57.5	52.5	20.3	18	600	-	45	-	1.5	-	210	MKP1848C72010JY5
1200	U_{OPDC} AT 70 °C = 1440 V, U_{OPDC} AT 105 °C = 850 V														
	1	11.0	21.0	32.0	27.5	-	85	85	3	-	45	-	45	-	MKP1848C51012JK2
	2	15.0	25.0	32.0	27.5	-	85	170	4	-	23	-	45	-	MKP1848C52012JK2
	3	18.0	28.0	32.0	27.5	-	85	255	6	-	15	-	45	-	MKP1848C53012JK2
	4	21.0	31.0	32.0	27.5	-	85	340	8	-	12	-	45	-	MKP1848C54012JK2
	5	20.0	35.0	32.0	27.5	-	85	425	8	-	10	-	45	-	MKP1848C55012JK2
	5	18.5	35.5	43.0	37.5	10.2	40	200	6	7	18	16	90	80	MKP1848C55012JP*
	6	18.5	35.5	43.0	37.5	10.2	40	240	7	8	15	14	90	80	MKP1848C56012JP*
	7	21.5	38.5	42.0	37.5	10.2	40	280	8	9	13	12	90	80	MKP1848C57012JP*
	8	21.5	38.5	42.0	37.5	10.2	40	320	9	10	11	10	90	80	MKP1848C58012JP*
	9	24.0	44.0	42.0	37.5	10.2	40	360	10	11	10	9	90	80	MKP1848C59012JP*
	10	24.0	44.0	42.0	37.5	10.2	40	400	10	11	9	8	90	80	MKP1848C61012JP*
	12	30.0	45.0	42.0	37.5	10.2 / 20.3	40	480	12	13	8	7	90	80	MKP1848C61212JP*
	15	30.0	57.0	42.0	37.5	20.3	40	600	14	14	6	5	90	80	MKP1848C61512JP*
	10	25.0	45.0	57.5	52.5	10.2	20	200	8	9	18	16	180	160	MKP1848C61012JY*
	12	25.0	45.0	57.5	52.5	10.2	20	240	8	9	15	13	180	160	MKP1848C61212JY*
	15	25.0	45.0	57.5	52.5	10.2	20	300	9	10	12	11	180	160	MKP1848C61512JY*
	20	30.0	45.0	57.5	52.5	20.3	20	400	11	12	9	8	180	160	MKP1848C62012JY*
	22	35.0	50.0	57.5	52.5	20.3	20	440	13	14	8	7	180	160	MKP1848C62212JY*
	25	35.0	50.0	57.5	52.5	20.3	20	500	14	15	7	6	180	160	MKP1848C62512JY*
	30	45.0	45.0	57.5	52.5	20.3	20	600	-	16	-	5	-	160	MKP1848C63012JY5
	60 [6]	65.5	65	57.5	52.5	20.3	20	400	-	40	-	2.5	-	180	MKP1848C66012JY5
	65 [6]	65.5	65	57.5	52.5	20.3	20	433	-	40	-	2	-	180	MKP1848C66512JY5
	140 [7]	130.0	65	57.5	52.5	20.3	20	466	-	45	-	1.5	-	180	MKP1848C71412JY5

Notes

(1) Change the * symbol with special code for the terminals
(2) Maximum RMS current at 10 kHz, +85 °C, Δt = +15 °C, capacitance tolerance ≤ ± 5 %
(3) Equivalent series resistance typical values at f = 10 kHz to 100 kHz for P = 27.5 mm, at f = 10 kHz to 70 kHz for P = 37.5 mm, at f = 10 kHz to 50 kHz for P = 52.5 mm
(4) Maximum tan δ values
(5) Standard dimension
(6) 6 pins. The dV/dt and I_{PEAK} specified are for individual capacitance value
(7) 12 pins. The dV/dt and I_{PEAK} specified are for individual capacitance value
(8) Intermediate capacitance values available on request

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PACKAGING INFORMATION

U_{NDC} (V)	HEIGHT (mm)	CAP. (5) (µF)	Ø dt	ORDERING CODE (1)	MASS (g)	SPQ (2) (pcs)
500	19	1	0.8	MKP1848C51050JK2	6	160
	19	2	0.8	MKP1848C52050JK2	5.5	160
	19	3	0.8	MKP1848C53050JK2	5.5	160
	21	4	0.8	MKP1848C54050JK2	8.5	130
	21	5	0.8	MKP1848C55050JK2	8.5	130
	25	6	0.8	MKP1848C56050JK2	10.5	100
	25	7	0.8	MKP1848C57050JK2	12.5	100
	25	8	0.8	MKP1848C58050JK2	11.5	100
	28	9	0.8	MKP1848C59050JK2	15	80
	28	10	0.8	MKP1848C61050JK2	16	80
	28	12	0.8	MKP1848C61250JK2	15	80
	31	15	0.8	MKP1848C61550JK2	21.5	65
	35	18	0.8	MKP1848C61850JK2	20	70
	35.5	20	1.0	MKP1848C62050JP*	36	105
	38.5	22	1.0	MKP1848C62250JP*	38	91
	38.5	25	1.0	MKP1848C62550JP*	36	91
	44	30	1.0	MKP1848C63050JP*	48	77
	44	35	1.0	MKP1848C63550JP*	57	77
	45	40	1.0	MKP1848C64050JP*	60	63
	45	45	1.0	MKP1848C64550JP*	70	63
	45	50	1.0	MKP1848C65050JP*	75	63
	57	55	1.0	MKP1848C65550JP*	68	63
	57	60	1.0	MKP1848C66050JP*	68	63
	57	65	1.0	MKP1848C66550JP*	70	63
	45	50	1.2	MKP1848C65050JY*	70	55
	45	55	1.2	MKP1848C65550JY*	96	55
	45	60	1.2	MKP1848C66050JY*	91	45
	45	65	1.2	MKP1848C66550JY*	100	45
	45	70	1.2	MKP1848C67050JY*	112	45
	50	75	1.2	MKP1848C67550JY*	108	40
	50	80	1.2	MKP1848C68050JY*	115	40
	50	90	1.2	MKP1848C69050JY*	127	40
	50	100	1.2	MKP1848C71050JY*	130	40
	45	110	1.2	MKP1848C71150JY5	135	30
	45	120	1.2	MKP1848C71250JY5	150	30
	65	250 (3)	1.2	MKP1848C72550JY5	266	20
	65	500 (4)	1.2	MKP1848C75050JY5	490	10
600	19	1	0.8	MKP1848C51060JK2	6	160
	19	2	0.8	MKP1848C52060JK2	5.5	160
	21	3	0.8	MKP1848C53060JK2	8.5	130
	21	4	0.8	MKP1848C54060JK2	8.5	130
	23	5	0.8	MKP1848C55060JK2	10.5	115
	25	6	0.8	MKP1848C56060JK2	12.5	100
	25	7	0.8	MKP1848C57060JK2	11.5	100
	28	8	0.8	MKP1848C58060JK2	15	80
	28	9	0.8	MKP1848C59060JK2	16	80
	28	10	0.8	MKP1848C61060JK2	15	80
	31	12	0.8	MKP1848C61260JK2	21.5	65
	35	15	0.8	MKP1848C61560JK2	20	70
	35.5	10	1.0	MKP1848C61060JP*	34	105
	35.5	12	1.0	MKP1848C61260JP*	32	105
	35.5	15	1.0	MKP1848C61560JP*	30	105
	38.5	20	1.0	MKP1848C62060JP*	36	91
	38.5	22	1.0	MKP1848C62260JP*	38	91
	38.5	25	1.0	MKP1848C62560JP*	36	91
	44	30	1.0	MKP1848C63060JP*	48	77
	45	35	1.0	MKP1848C63560JP*	57	63

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U_{NDC} (V)	HEIGHT (mm)	CAP. [5] (µF)	Ø dt	ORDERING CODE [1]	MASS (g)	SPQ [2] (pcs)
600	45	40	1.0	MKP1848C64060JP*	60	63
	45	45	1.0	MKP1848C64560JP*	60	63
	57	50	1.0	MKP1848C65060JP*	68	63
	45	40	1.2	MKP1848C64060JY*	66	55
	45	45	1.2	MKP1848C64560JY*	70	55
	45	50	1.2	MKP1848C65060JY*	88	45
	45	55	1.2	MKP1848C65560JY*	96	45
	45	60	1.2	MKP1848C66060JY*	91	45
	50	65	1.2	MKP1848C66560JY*	100	40
	50	70	1.2	MKP1848C67060JY*	112	40
	50	75	1.2	MKP1848C67560JY*	108	40
	50	80	1.2	MKP1848C68060JY*	102	40
	45	90	1.2	MKP1848C69060JY5	127	30
	45	100	1.2	MKP1848C71060JY5	120	30
	65	200 [3]	1.2	MKP1848C72060JY5	266	20
	65	400 [4]	1.2	MKP1848C74060JY5	490	10
800	19	1	0.8	MKP1848C51080JK2	6	160
	19	2	0.8	MKP1848C52080JK2	5.5	160
	21	3	0.8	MKP1848C53080JK2	8.5	130
	23	4	0.8	MKP1848C54080JK2	10.5	115
	25	5	0.8	MKP1848C55080JK2	12	100
	28	6	0.8	MKP1848C56080JK2	17	80
	28	7	0.8	MKP1848C57080JK2	16	80
	28	8	0.8	MKP1848C58080JK2	15	80
	31	9	0.8	MKP1848C59080JK2	22	65
	31	10	0.8	MKP1848C61080JK2	21	65
	35	12	0.8	MKP1848C61280JK2	20	70
	35.5	10	1.0	MKP1848C61080JP*	34	105
	35.5	12	1.0	MKP1848C61280JP*	32	105
	35.5	15	1.0	MKP1848C61580JP*	30	105
	38.5	20	1.0	MKP1848C62080JP*	36	91
	44	22	1.0	MKP1848C62280JP*	49	77
	44	25	1.0	MKP1848C62580JP*	47	77
	45	30	1.0	MKP1848C63080JP*	62	63
	45	35	1.0	MKP1848C63580JP*	55	63
	57	40	1.0	MKP1848C64080JP*	60	63
	45	30	1.2	MKP1848C63080JY*	76	55
	45	35	1.2	MKP1848C63580JY*	71	55
	45	40	1.2	MKP1848C64080JY*	66	55
	45	45	1.2	MKP1848C64580JY*	95	45
	45	50	1.2	MKP1848C65080JY*	88	45
	50	55	1.2	MKP1848C65580JY*	112	40
	50	60	1.2	MKP1848C66080JY*	107	40
	50	65	1.2	MKP1848C66580JY*	100	40
	45	70	1.2	MKP1848C67080JY5	128	30
	45	75	1.2	MKP1848C67580JY5	123	30
	45	80	1.2	MKP1848C68080JY5	119	30
	65	160 [3]	1.2	MKP1848C71680JY5	264	20
	65	320 [4]	1.2	MKP1848C73280JY5	359	10

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U_{NDC} (V)	HEIGHT (mm)	CAP. (5) (µF)	Ø dt	ORDERING CODE (1)	MASS (g)	SPQ (2) (pcs)
900	19	1	0.8	MKP1848C51090JK2	6.5	160
	21	2	0.8	MKP1848C52090JK2	9	130
	23	3	0.8	MKP1848C53090JK2	11	115
	25	4	0.8	MKP1848C54090JK2	12	100
	28	5	0.8	MKP1848C55090JK2	17	80
	28	6	0.8	MKP1848C56090JK2	16	80
	31	7	0.8	MKP1848C57090JK2	23	65
	31	8	0.8	MKP1848C58090JK2	21	65
	35	9	0.8	MKP1848C59090JK2	20	70
	35	10	0.8	MKP1848C61090JK2	20	70
	35.5	9	1.0	MKP1848C59090JP*	32	105
	35.5	10	1.0	MKP1848C61090JP*	32	105
	35.5	12	1.0	MKP1848C61290JP*	30	105
	38.5	15	1.0	MKP1848C61590JP*	37	91
	44	20	1.0	MKP1848C62090JP*	47	77
	45	22	1.0	MKP1848C62290JP*	65	63
	45	25	1.0	MKP1848C62590JP*	61	63
	57	30	1.0	MKP1848C63090JP*	68	63
	57	35	1.0	MKP1848C63590JP*	70	63
	45	30	1.2	MKP1848C63090JY*	69	55
	45	35	1.2	MKP1848C63590JY*	97	45
	45	40	1.2	MKP1848C64090JY*	91	45
	50	45	1.2	MKP1848C64590JY*	112	40
	50	50	1.2	MKP1848C65090JY*	104	40
	45	55	1.2	MKP1848C65590JY5	131	30
	45	60	1.2	MKP1848C66090JY5	125	30
	65	120 (3)	1.2	MKP1848C71290JY5	276	20
	65	240 (4)	1.2	MKP1848C72490JY5	393	10
1000	19	1	0.8	MKP1848C51010JK2	6	160
	23	2	0.8	MKP1848C52010JK2	11	115
	25	3	0.8	MKP1848C53010JK2	12	100
	28	4	0.8	MKP1848C54010JK2	16.5	80
	31	5	0.8	MKP1848C55010JK2	22.5	65
	31	6	0.8	MKP1848C56010JK2	21	65
	35	7	0.8	MKP1848C57010JK2	21	70
	35.5	5	1.0	MKP1848C55010JP*	32	105
	35.5	6	1.0	MKP1848C56010JP*	30	105
	35.5	7	1.0	MKP1848C57010JP*	33	105
	35.5	8	1.0	MKP1848C58010JP*	31	105
	35.5	9	1.0	MKP1848C59010JP*	30	105
	38.5	10	1.0	MKP1848C61010JP*	39	91
	38.5	12	1.0	MKP1848C61210JP*	36	91
	44	15	1.0	MKP1848C61510JP*	47	77
	45	20	1.0	MKP1848C62010JP*	57	63
	57	22	1.0	MKP1848C62210JP*	60	63
	57	25	1.0	MKP1848C62510JP*	60	63
	45	15	1.2	MKP1848C61510JY*	70	55
	45	20	1.2	MKP1848C62010JY*	73	55
	45	22	1.2	MKP1848C62210JY*	70	55
	45	25	1.2	MKP1848C62510JY*	98	45
	45	30	1.2	MKP1848C63010JY*	89	45
	50	35	1.2	MKP1848C63510JY*	109	40
	50	40	1.2	MKP1848C64010JY*	99	40
	45	45	1.2	MKP1848C64510JY5	124	30
	45	50	1.2	MKP1848C65010JY5	117	30
	65	100 (3)	1.2	MKP1848C71010JY5	259	20
	65	200 (4)	1.2	MKP1848C72010JY5	608	10

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PACKAGING INFORMATION						
U_{NDC} (V)	HEIGHT (mm)	CAP. [5] (µF)	Ø dt	ORDERING CODE [1]	MASS (g)	SPQ [2] (pcs)
1200	21	1	0.8	MKP1848C51012JK2	9	130
	25	2	0.8	MKP1848C52012JK2	12	100
	28	3	0.8	MKP1848C53012JK2	16	80
	31	4	0.8	MKP1848C54012JK2	21.5	65
	35	5	0.8	MKP1848C55012JK2	20	70
	35.5	5	1.0	MKP1848C55012JP*	33	105
	35.5	6	1.0	MKP1848C56012JP*	30	105
	38.5	7	1.0	MKP1848C57012JP*	39	91
	38.5	8	1.0	MKP1848C58012JP*	37	91
	44	9	1.0	MKP1848C59012JP*	50	77
	44	10	1.0	MKP1848C61012JP*	48	77
	45	12	1.0	MKP1848C61212JP*	63	63
	57	15	1.0	MKP1848C61512JP*	60	63
	45	10	1.2	MKP1848C61012JY*	81	55
	45	12	1.2	MKP1848C61212JY*	77	55
	45	15	1.2	MKP1848C61512JY*	70	55
	45	20	1.2	MKP1848C62012JY*	91	45
	50	22	1.2	MKP1848C62212JY*	115	40
	50	25	1.2	MKP1848C62512JY*	108	40
	45	30	1.2	MKP1848C63012JY5	126	30
	65	60 [3]	1.2	MKP1848C66012JY5	256	20
	65	65 [3]	1.2	MKP1848C66512JY5	257	20
	65	140 [4]	1.2	MKP1848C71412JY5	608	10

Notes
(1) Change the * symbol with special code for the terminals
(2) SPQ = Standard Packing Quantity
(3) 6 pins
(4) 12 pins
(5) Intermediate capacitance values available on request

CONSTRUCTION DESCRIPTION

Low inductive wound cell elements of metallized polypropylene film, potted with resin in a flame retardant case.

SPECIFIC METHOD OF MOUNTING TO WITHSTAND VIBRATION AND SHOCK

The capacitor unit is designed for mounting on a printed circuit board.

In order to withstand vibration and shock tests, it must be insured that the stand-off pips are in good contact with the printed circuit board.

The capacitors shall be mechanically fixed by the leads and the body clamped.

SPACE REQUIREMENTS ON PRINTED-CIRCUIT BOARD

For product height with seating plane as given by “IEC 60717” as reference.

For 2 pins:

The maximum space for length ($l_{max.}$), width ($w_{max.}$) and height ($h_{max.}$) of film capacitors to take in account on the printed circuit board is shown in the drawings.

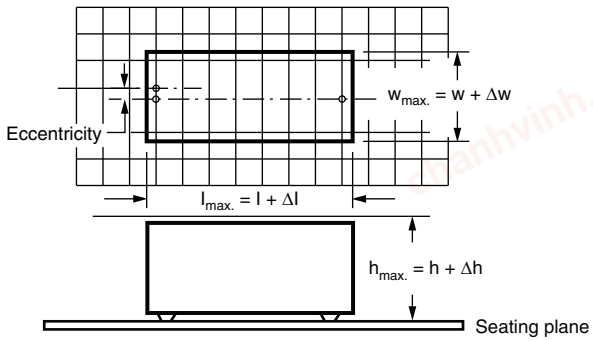
- For products with 15 mm < pitch ≤ 27.5 mm $\Delta w = \Delta l = 0.5$ mm and $\Delta h = 0.1$ mm
- For products with pitch = 37.5 mm, $\Delta w = \Delta l = 0.7$ mm and $\Delta h = 0.5$ mm
- For products with pitch = 52.5 mm, $\Delta w = \Delta l = 1.0$ mm and $\Delta h = 0.5$ mm

Eccentricity defined as in drawing. The maximum eccentricity is smaller than or equal to the lead diameter of the product concerned.

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The maximum length and width of film capacitors is shown in the figure:



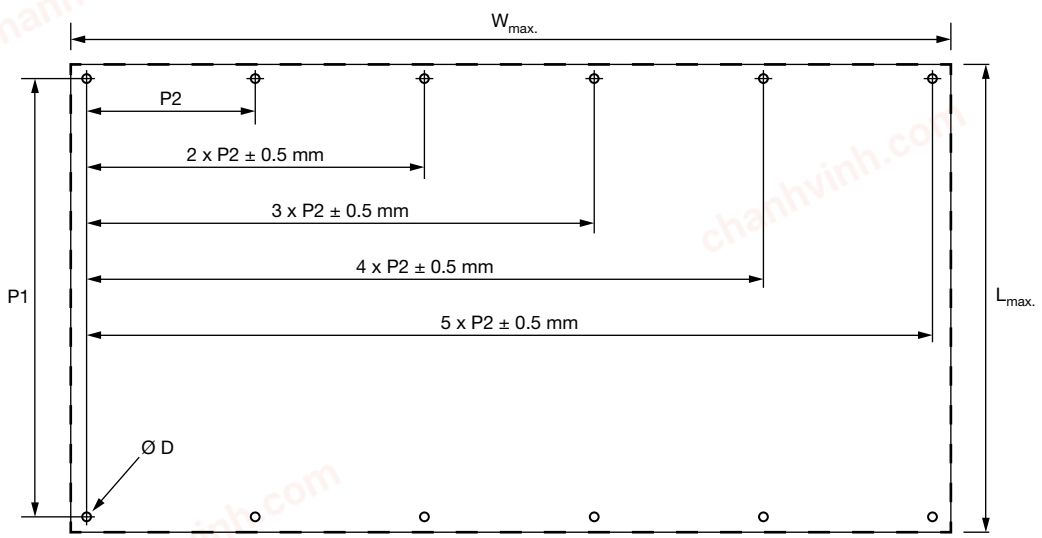
For the minimum product dimensions for length ($l_{min.}$), width ($w_{min.}$) and height ($h_{min.}$) following tolerances of the components are valid:

$l_{min.} = l - \Delta l$, $w_{min.} = w - \Delta w$, and $h_{min.} = h - \Delta h$ following

- for products with 15 mm < pitch ≤ 27.5 mm, Δl = 1.0 mm, and $\Delta w = \Delta h$ = 0.5 mm
- for products with pitch = 37.5 mm, Δl = 1.0 mm, and $\Delta w = \Delta h$ = 1.0 mm
- for products with pitch = 52.5 mm, Δl = 1.5 mm, and $\Delta w = \Delta h$ = 1.0 mm

For 4 pins, 6 pins, and 12 pins:

DIMENSIONS in millimeters



P1	$L_{max.}$	$W_{max.}$	Ø D	H
37.5	l + 1.5	w + 1.8	1.5	h + 0.5
52.5	l + 1.8	w + 2.0	1.7	h + 0.5

SOLDERING CONDITIONS

For general soldering conditions and wave soldering profile we refer to the document “Soldering Conditions Vishay Film Capacitors”: www.vishay.com/doc?28171

STORAGE TEMPERATURE

T_{stg} = -25 °C to +35 °C with relative humidity of maximum 75 % without condensation

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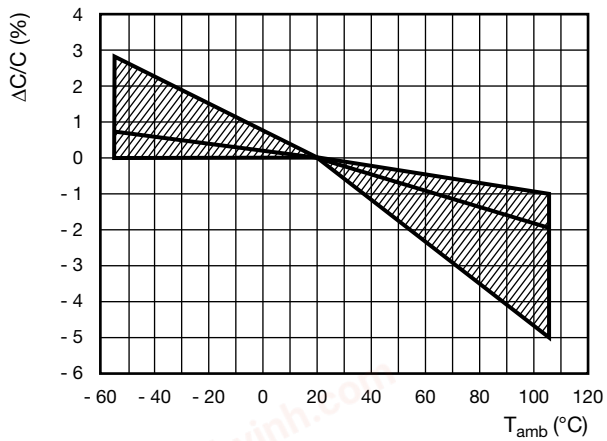
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RATINGS AND CHARACTERISTICS REFERENCE CONDITIONS

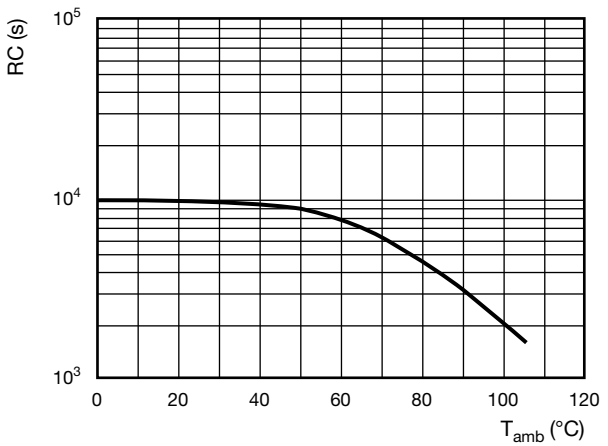
Unless otherwise specified, all electrical values apply to an ambient temperature of 23 °C ± 1 °C, an atmospheric pressure of 86 kPa to 106 kPa and a relative humidity of 50 % ± 2 %.

For reference testing, a conditioning period shall be applied over 96 h ± 4 h by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20 %.

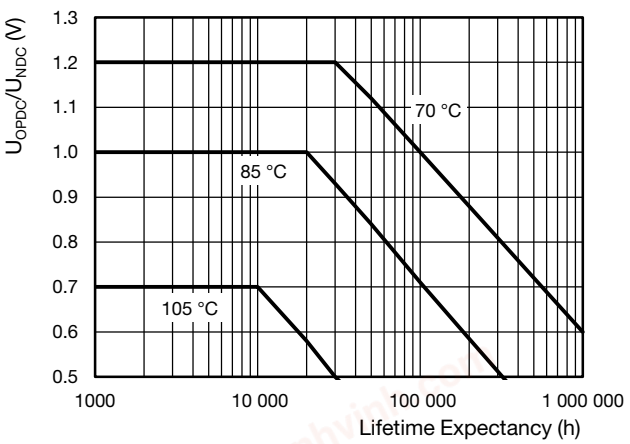
CHARACTERISTICS



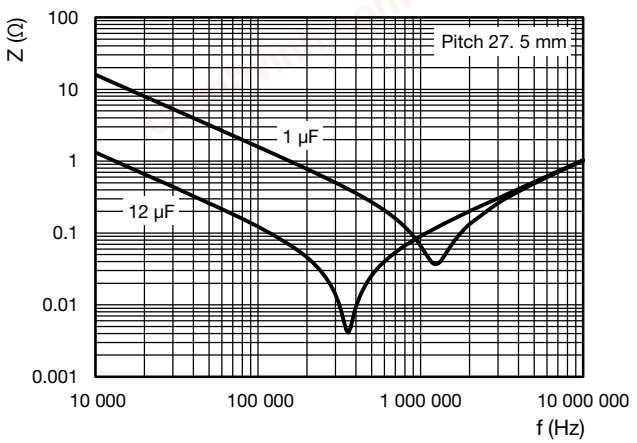
Capacitance as a function of ambient temperature (typical)



Insulation resistance as a function of ambient temperature (typical)



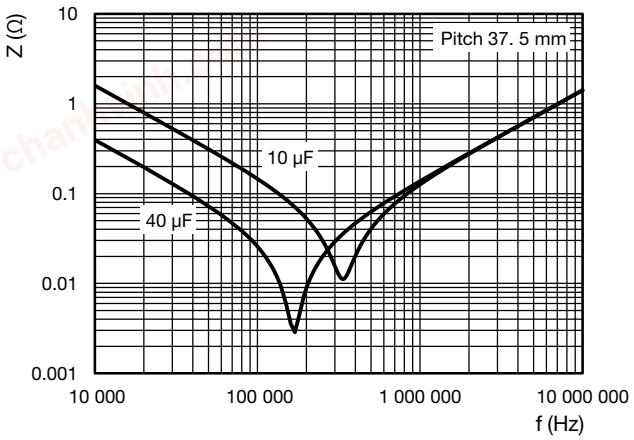
Lifetime expectancy (typical)



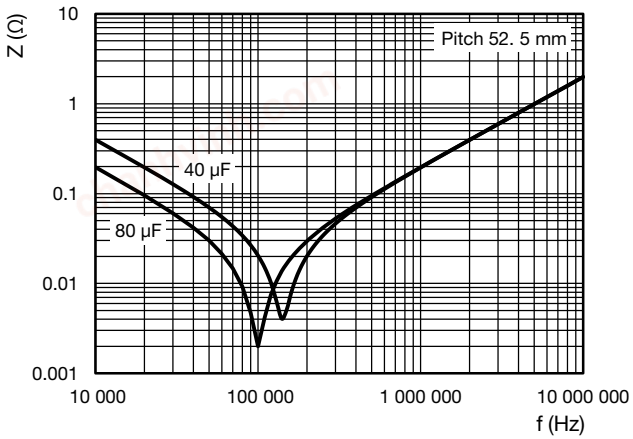
Impedance vs. Frequency (typical)

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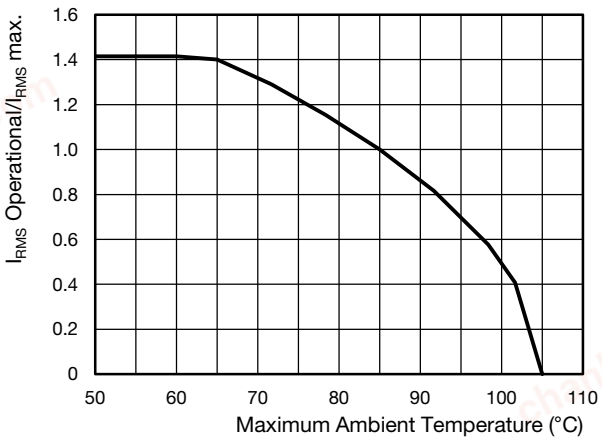
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Impedance vs. Frequency (typical)



Impedance vs. Frequency (typical)



Maximum I_{RMS} current in function of the ambient temperature

HEAT CONDUCTIVITY

DIMENSION (mm)			HEAT CONDUCTIVITY (mW/°C)
w	h	l	
9.0	19.0	32.0	24
11.0	21.0	32.0	28
13.0	23.0	32.0	32
15.0	25.0	32.0	36
18.0	28.0	32.0	44
21.0	31.0	32.0	51
20.0	35.0	32.0	56
18.5	35.5	43.0	54
21.5	38.5	42.0	61
24.0	44.0	42.0	70
30.0	45.0	42.0	81
25.0	45.0	57.5	77
30.0	45.0	57.5	85
35.0	50.0	57.5	100
45.0	45.0	57.5	94
65.5	65.0	57.5	152
130.0	65.0	57.5	243

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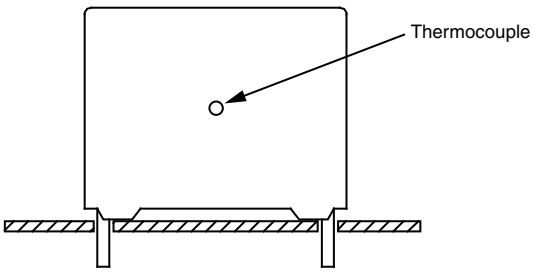
POWER DISSIPATION AND MAXIMUM COMPONENT TEMPERATURE RISE

The power dissipation must be limited in order not to exceed the maximum allowed component temperature rise as a function of the free air ambient temperature.

The component temperature rise (ΔT) can be measured or calculated by ΔT = P/G:

- $\Delta T = T_{case} - T_{ambient}$ = case temperature rise (°C) with a maximum of 15 °C at rated temperature.
- $P = I_{RMS}^2 \times ESR$ = power dissipation of the component (mW)
- G = heat conductivity of the component (mW/°C)

MEASURING THE COMPONENT TEMPERATURE



The case temperature is measured in unloaded condition (T_{amb}) and loaded condition (T_C).

To avoid external thermal radiation or convection, the capacitor must be tested in a closed area, free from air circulation.

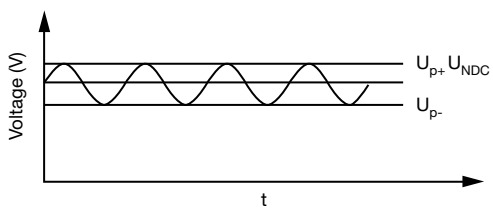
APPLICATION NOTES AND LIMITING CONDITIONS

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection. These mains applications are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.

To select the capacitor for a certain application, the following conditions must be checked:

1. The continuous peak voltage (U_{p+}) shall not exceed the DC voltage rating (U_{NDC})
2. The peak-to-peak ripple voltage (U_{pp}) shall not be greater than 0.2 x U_{NDC}

Non reversing recurrent waveform



3. For capacitors connected in parallel, normally the proof voltage and possibly the rated voltage must be reduced. For information depending of the capacitance value and the number of parallel connections contact dc-film@vishay.com.
4. The voltage peak slope (dU/dt) shall not exceed the pulse slope at the DC voltage rating. If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by U_{NDC} and divided by the applied voltage.

   For all other pulses following equation must be fulfilled:

$$2 \times \int_0^T \left(\frac{dU}{dt}\right)^2 \times dt < U_{NDC} \times \left(\frac{dU}{dt}\right)_{rated}$$

   T is the pulse duration

MAXIMUM REPETITIVE PEAK VOLTAGES	
REPETITIVE SURGE VOLTAGE	**MAXIMUM DURATION PER DAY**
1.1 x U_{NDC}	30 % of on load duration
1.15 x U_{NDC}	30 min
1.2 x U_{NDC}	5 min
1.3 x U_{NDC}	1 min
1.5 x U_{NDC}	110 ms

Note

- The capacitor unit may be subjected to the surge above without any significant reduction of lifetime expectancy

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INSPECTION REQUIREMENTS		
SUB-CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
ROUTINE TEST - FINAL INSPECTION		
5.14.2-1 External inspection, visual examination		Legible marking as specified
5.14.2-2 Dimensions		See specification drawing
5.3-1 Capacitance	1 kHz at room temperature	See specific reference data
5.3-2 tan δ	1 kHz at room temperature 10 kHz at room temperature	See specific reference data
5.5.1-2 Voltage test between terminals	1.5 x U_{NDC} at T_{amb} Duration: 10 s	No visible damage or puncture No flashover
5.7 Insulation resistance	U_{NDC} ≤ 500 V measuring voltage 100 V at room temperature U_{NDC} > 500 V measuring voltage 500 V at room temperature Duration: 1 min	See specific reference data
TYPE TESTS		
5.14.2 External inspection	Check for finish, marking and overall dimensions	Legible marking and finish as specified Dimensions: see specification drawing
5.14.0 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.14.1-1/4 Robustness of terminations IEC 60068-2-21	Tensile Ua1 Wire diameter / Section modulus / Load ≤ 0.8 mm / ≤ 0.5 mm² / 10 N ≤ 1.25 mm / ≤ 1.2 mm² / 20 N Duration: 10 s ± 1 s Bending, Ub method 1 Wire diameter / Section modulus / Load ≤ 0.8 mm / ≤ 0.05 mm² / 10 N ≤ 1.25 mm / ≤ 0.019 mm² / 20 N 4 x 90°, duration: 2 s to 3 s/bend	
5.14.1-6 Resistance to soldering heat IEC 60068-2-20	No pre-drying, method 1A Solder bath: 260 °C ± 5 °C Duration: 10 s ± 1 s	
5.14.4 Final measurements	Capacitance tan δ	|ΔC/C| ≤ 0.5 % Increase of tan δ ≤ 0.0050 compared to the values measured in 5.14.0
5.14.0 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.14.3-1 Vibration IEC 60068-2-6	10 Hz to 55 Hz; amplitude ± 0.35 mm or acceleration 98 m/s² Test duration: 10 frequency cycles 3 axes offset from each other by 90° 1 octave/min Visual examination	 No visible damage
5.14.3-2 Shock or impact IEC 60068-2-6	Pulse shape: half sine Acceleration: 490 m/s² Duration of pulse: 11 ms Visual examination	 No visible damage
5.14.4 Final measurements	Capacitance tan δ	|ΔC/C| ≤ 0.5 % Increase of tan δ ≤ 0.0050 compared to the values measured in 5.14.0

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INSPECTION REQUIREMENTS		
SUB-CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
5.5.3-1 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz R insulation	
5.5.3-2 Voltage test between terminals	1.5 x U_{NDC} at T_{amb} Duration: 60 s	
5.5.3-3 Final measurements	Capacitance tan δ R insulation	$\lvert\Delta C/C\rvert \leq 0.5$ % Increase of tan $\delta \leq 0.0050$ R insulation ≤ 50 % of specified values
5.9-1 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.9-2 Surge discharge test	1.1 x U_{NDC} Number of discharges: 5 Time lapse: every 2 min (10 min total)	
5.9-2 Voltage test between terminals	Within 5 min after the surge discharge test Duration: 60 s 1.5 x U_{NDC} at T_{amb}	
5.9-3 Final measurements	Capacitance tan δ at 10 kHz	$\lvert\Delta C/C\rvert \leq 1.0$ % tan $\delta \leq 1.2$ x initial tan $\delta + 0.0001$ compared to the values measured in 5.9-1
5.11-1 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.11-2 Self healing test	1.5 x U_{NDC} Duration: 10 s Number of clearings ≤ 5 Clearing = voltage drop of 5 % increase the voltage at 100 V/s till 5 clearings occur with a max. of 2.5 x U_{NDC} for a duration of 10 s	
5.11-3 Final measurements	Capacitance tan δ	$\lvert\Delta C/C\rvert \leq 0.5$ % tan $\delta \leq 1.2$ x initial tan $\delta + 0.0001$ compared to the values measured in 5.11-1
5.13-0 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.13-1 Change of temperature according to IEC 60682-2-14	Test Nb $T_{max.}$ = 85 °C $T_{min.}$ = -55 °C Transition time: 1 h, equivalent to 1 °C/min. 5 cycles	
5.13-2 Damp heat steady state according to IEC 60682-2-78	Test Ca $T_{max.}$ = 40 °C + 2 °C RH = 93 % ± 3 % Duration: 56 days	
5.5.3-2 Voltage test between terminals	1.5 x U_{NDC} at ambient temperature Duration: 60 s	
5.13-3 Final measurements	Visual examination	No puncturing or flashover Self healing punctures are permitted
	Capacitance tan δ at 1 V_{RMS} 10 kHz	$\lvert\Delta C/C\rvert \leq 2.0$ % Increase of tan $\delta \leq 0.0150$ compared to the values measured in 5.13-0

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INSPECTION REQUIREMENTS		
SUB-CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
5.10.0 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.10-1 Thermal stability test under overload conditions	Natural cooling T_{amb} ± 5 °C 1.21 x $P_{max.}$ = (U_2/2) x W_2 x C x tan δ = 1.21 x ($I^2_{max.}$/W_2 x C) x tan δ with W_2 = 2 x p x f_2 for $I_{max.}$ (see specific reference data) f_2 = 10 kHz Duration: 48 h	
5.10-2 Final measurements	Measure the temperature every 1.5 h during the last 6 h	Temperature rise ≤ 1 °C |ΔC/C| ≤ 2.0 % Increase of tan δ ≤ 1.2 x initial δ + 0.0150
5.12 Resonance frequency measurement	Impedance analyser at T_{amb}	< 0.9 times the value as specified in typical curve “Resonant frequency” of this specification
5.15-0 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.15-1 Endurance test between terminals	Sequence: 1.3 x U_{NDC} at 85 °C 1.3 x U_{OPDC} at 105 °C Duration: 500 h 1000 x discharge at 1.3 x I_{peak} (maximum respective peak current in continuous operation) 1.3 x U_{NDC} at 85 °C 1.3 x U_{OPDC} at 105 °C Duration: 500 h	
5.15-2 Final measurement	Capacitance tan δ	|ΔC/C| ≤ 3.0 % Increase of tan δ ≤ 0.0150 compared to the values measured in 5.15-0
5.16.3-0A Initial measurements	Capacitance at 1 kHz	
5.16.3-1A Destruction test sequence for non segment film	$T_{max.}$ = 85 °C Product enveloped with cheese cloth	
High DC voltage test	3 x U_{NDC} or DC voltage until repetitive product healings occur Duration = 15 min	Audible healings or check healings with oscilloscope
High AC voltage test	AC RMS voltage = U_{NDC}/2 √2 with minimum of 250 V_{AC} Duration = 5 min Repeat destruction sequence 3 x	
5.16.3-2A Final measurements	Visual examination	No puncturing, flashover or burning of the cheese cloth Self healing punctures are permitted

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